

THE
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PART IV.

Miscellaneous Papers.

Extract from the Annual Report of the Superintendent of Government Farms, Madras Presidency, for the year ending 31st March 1874.

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Para 44. *Live Fences.*—The appearance of the country might be greatly improved if our ryots could be induced to plant live fences around their fields; such fences would be of use in many ways, they would protect crops from damage by trespassing cattle, they would moderate the force of the wind, and lessen the losses that are sometimes experienced about harvest time from the effects of storms; they would render the herding of cattle and sheep unnecessary, and be of use in many other ways, but their chief use would be to afford fuel for domestic purposes, the cattle dung now used by the ryot as fuel being set free for use in a legitimate way.

45. There are many kinds of shrubs admirably adapted for forming fences, each suited to the various conditions met with in different parts of the Presidency. One of the most generally useful is the corkapilly (*Inga dulcis*) which resembles the English hedge-thorn very much in general appearance, and which has been grown on a considerable scale on the Sydapet Farms. A hedge of this shrub can be raised at a very moderate expenditure of labor, it is only necessary to dig a trench about $1\frac{1}{2}$ feet deep and 12 inches wide along the line of the proposed fence, and to fill this trench with a mixture of good surface soil and any manure that is available; when this is done the seed is to be sown, say in three parallel lines at equal distances in the trench. If the seed is put down with the first showers of the monsoon, it will be unnecessary to use water; if, however, sowing is done in the dry season, which perhaps the ryot will find the most convenient time in the year, he having then no urgent field-work to engage his attention, it will be necessary to apply water regularly until the seedlings are at the least one foot in height; but good treatment is not lost on a hedge of this kind; a fence that is properly started is always the least costly to maintain in good order. After the second year the hedge may be cut regularly once a year, and will yield a large quantity of excellent fuel. When established, a mile of such a fence under fairly good treatment in a climate similar

to that of Madras will yield annually from 30 to 40 cart-loads of cuttings, most of which would be well suited for use in the house of the ryot. The cutting should be done only after the monsoon has passed over, thus securing the fences, when at their full height, to protect growing crops from the ill effects of the high winds that prevail during the monsoon.

46. *Deep and shallow cultivation.*—Some most mischievous opinions have recently been spread through India regarding the effects of deep cultivation in hot climates; I feel it my duty, therefore, to state most unreservedly that the result of my six years' experience in actual cultivation in one of the hottest parts of Southern India has convinced me beyond all doubt that the advantage that the Madras farmer will secure by deeply tilling his soil can scarcely be overrated.

47. Shallow cultivation is the curse of Indian agriculture, and the man who can induce the ryot to add an extra inch or two to the depth his tillage operations extend, will be as much entitled to the gratitude of his country, as the man who makes two blades of grass to grow where only one grew before.

48. Now in referring to deep cultivation or deep tillage I do not necessarily mean deep ploughing; it is here, I believe, where the mistaken opinions before noticed have originated. By deep tillage or deep cultivation I mean that the soil must be deeply stirred or loosened by the cultivator, the subsoil plough, &c. As a general rule all soils will be benefited that are thus treated; but the case is different with deep ploughing when the soil is unfitted, as there are many soils that would be temporarily injured by being suddenly deep ploughed, such soils for instance as those resting on a tenacious soapy subsoil, which in the process of deep ploughing would be brought to the surface and would render the surface soil unproductive until physical and chemical agencies had again restored it to a condition fit for the growth of crops; and it would be equally as unwise to bring up to the surface, by working the plough more deeply, portions of a subsoil, which is poorer than the surface soil, or that is calculated to injure the surface soil in its physical character.

49. As a general rule deeper ploughing should be done gradually, that is, the process of deepening should be the work of time, though there are soils that may be deepened at once without any bad results following. It should be remembered that in deep ploughing the under soil is always brought to the surface, while in deep cultivation the under soil or subsoil remains in its original position, its particles being merely loosened, thus allowing a free passage for air and water.

50. A dry season brings out in a decisive way the results of deep culture; during the long drought experienced last year the maize plants growing on a piece of land on the Experimental Farm that had been subsoil drained in the previous year, were more than twice as large, and proportionately luxuriant than grew over the newly-filled drains, than the plants that grew on the land between the lines of drains, the former during the greatest heat were always remarkably luxuriant, they drew their supplies of moisture far down below the parched surface soil, while the plants on the intervening spaces were puny and sickly, their roots not being able to penetrate more than a few inches below the parched upper soil. Similar results I have always obtained whenever I have had the soil deeply cultivated. I have gradually year after year deepened the cultivation on the Sydapat Farms until the soil is fully 50 per cent deeper than similar soils under ordinary native farming, and I would gladly go deeper still; indeed I feel sure that we can never secure good average results from our farming until we do cultivate deeper. In the hottest season the crops on the deeply tilled soil are generally fresh and luxuriant in appearance, while those growing on shallow soils are parched and withered.

51. *Want of enterprise in the Ryot as shewn by his carelessness regarding the quality of the field seeds he sows.*—Native cultivators pay but little attention to the quality of the seed they sow; this neglect is the result of ignorance or apathy, it cannot be said to be the result of want of means—the too common apology offered for all the shortcomings of the ryot—for in many cases a little personal labor expended in separating the seed is all that is required. The extra cost of the seed for an acre of land of the quality it is advisable to sow would seldom be more than one rupee, while the return obtained from this seed may be many rupees greater than the return from inferior seed.

52. Again native cultivators will persist year after year in sowing seed, the produce of their own land, rather than put themselves to the trouble of sending a few miles for fresh seed the produce of soils of a different description to those they cultivate.

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54. The loss that results from the use of bad seed and from thick seeding will, I have little doubt, annually represent a sum equal to, at the least, one half of the sum paid per acre in the form of Government assessment on the arable land of this Presidency, in other words by the exercise of a little intelligence, and by the expenditure of a small amount of labor, most ryots holding arable land could reduce their annual assessment 50 per cent—a result which I should imagine all would be glad to secure—and yet how few there are who could be induced to put in force the means required to produce these results.

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SYDAPET EXPERIMENTAL FARM.

56. *Cattle.*—With the view of effecting some improvement in the cattle of the district around Madras, it is intended to import a few animals of the Aden breed. One bull, two cows, and two calves have been purchased, for shipment from Aden to Madras by the first favorable opportunity. The Adens have a high reputation as dairy animals; the name Aden by which they are distinguished has probably originated from Aden being the port from which cattle of this breed are generally shipped, they are not found in the neighbourhood of Aden, but are brought from districts situated at considerable distances from the coast. They are small animals, and the bulls of the breed are therefore better suited for use in the early stages of experiments in improving the breeds of small cattle generally found in Southern India than are bulls of the Nellore and Mysore breeds, which in some instances have been used for this purpose. To shew how great a mistake it is to use bulls of these large breeds in attempting to improve the cattle of Southern India, it is only necessary to mention that a cow of an average size generally weighs from 200 to 300 lbs. live weight, while a good bull of the Nellore or Mysore breed will weigh from 900 to 1,000 lbs.

57. In attempting to improve breeds of cattle, great care should be exercised in order that the increase in size bears a strict relation to the supply of food available. In most parts of this Presidency during the dry months, even in a moderately good season, the food available is scarcely sufficient to preserve the lives of the undersized cattle kept by ryots, and would, therefore, be totally inadequate to do even this much for animals of a larger size.

58. Before taking steps for improving the size of the cattle in the more backward parts of the Presidency, it is necessary that something should be done to induce ryots to grow fodder, &c., as food for their live stock. As long as so many ryots consider that it is more economical to allow their cattle to starve or even to die in the dry season

rather than to go to the trouble of growing fodder for their use, it will be exceedingly unwise to attempt to increase the size of the cattle they keep.

59. The increase in the size of the draught cattle of Southern India is highly to be desired ; greater size means more strength, deeper cultivation, better crops.

60. Native cattle like native laborers can adapt themselves readily to the bad conditions with which they have so frequently to contend. A cooly, while work is abundant and food cheap, takes his three meals per day ; as the work becomes less abundant or food dearer, he reduces his allowance to two meals per day ; and he will manage to exist even on one meal per day when out of employment or food is very dear. The starving process is gradual ; the people become accustomed to it. It is the same with cattle ; they can be starved down to, and be kept alive, for a time, on a daily allowance of food that would represent only a tithe of the quantity they could consume when in full health. This is the ordinary process to which they are subjected every hot season at the hand of their owners. But while it is possible to reduce gradually the daily food of a bullock until its amount it would not be one-tenth of the allowance that should be given, it is not so easy again to increase without injury the daily allowance of food to the quantity necessary to support the animal in health ; hence the enormous losses that are experienced in this country amongst live stock when after a long drought a sudden fall of rain produces a luxuriant and plentiful growth of grass. Few cattle die directly from starvation ; the deaths in most cases are the result of the sudden supply of succulent food in abundance, greedily eaten by animals whose constitutions have been weakened by a long and gradual starving process.

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66. *Sheep.*—The sheep breeding experiment continues to progress in a satisfactory way. There is a decided improvement in the quality of the wool now obtained from our sheep ; when we commenced the experiment the wool yielded by most of them was exceedingly coarse and almost quite straight ; it is now finer and is a great deal more curled. There is, of course, very much yet to be done before the average quality of the wool is even moderately good, but the improvement that has been effected is very encouraging.

67. At one time I feared that in this hot climate but little could be done towards improving the quality of wool ; but though the intense heat is a great drawback we possess one advantage over people resident in a cold climate in being able to grow crops throughout the year for the use of sheep, and this is a very important advantage in wool growing. When sheep are alternately starved and overfed, their wool is always very irregular in strength and quality, the portion of the staple produced during the period when food was scarce being always weak.

68. As our experiments have shewn that we can produce green food throughout the year, I now see no reason why we should not ultimately produce fine wool : it must be remembered that some of the finest wools produced in the world are grown in countries in which the temperature has a high average range ; for instance in Spain, Southern Germany, the Southern States of America, the Northern Districts of Australia, &c.

69. It will, of course, take a long time to produce a fine wool from the Sydapat breed of sheep ; but by judicious crossing with fine wool producing breeds that will stand the intense heat experienced in Madras during the hot season, we may bring about the desired results in much less time.

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99. *Paddy Fodder—green, and dry.*—I have already directed attention to indigenous paddy as a fodder producer. During the past year we grew a considerable quantity of this fodder; it is readily eaten by all kinds of farm stock; when produced on land in a good manural condition it is of course much more nutritive than when grown under the conditions that characterize native farming. It is not so well adapted as a food for dairy stock as is cholum fodder; a milch cow when consuming daily 45 lbs. of cholum fodder yielded three measures of milk per diem but when paddy fodder was substituted, though a similar weight was consumed, the yield of milk was reduced to two measures; when feeding with cholum fodder was resumed, the daily yield of milk again rose to the quantity obtained previous to the change of food. This result is not surprising when the habits of the two plants are compared; the paddy is an aquatic plant, its growth is rapid provided it meets with a sufficiency of organic food in the soil or in the water in which it is growing, a quantity of available plant food that would suffice for the wants of a paddy crop when irrigated would be altogether insufficient to meet the wants of a dry crop; irrigation water, judiciously applied, enables a plant to utilize thoroughly the food in its neighbourhood, not only by rendering that food more fit for assimilation, but by bringing it within reach of its roots. Dry crops, such as cholum, &c., grow steadily during favorable weather; as their roots have but a very limited feeding ground, merely the portions of the soil with which they are in contact, it is of the utmost importance for their healthy development that the soil should be rich in plant food, much greater in proportion than is requisite in a soil under a crop of paddy.

100. Under proper manuring and careful watering the nutritive value of paddy fodder might be considerably increased, there can, I think, be no doubt, but that the most nutritive paddy fodder that could be raised would be that produced by the least expenditure of water, especially if the field was occasionally allowed to dry for a day or two in order to admit capillary action to exert its influence in bringing up to the surface plant food from a lower stratum of soil. Though paddy fodder as generally grown is inferior to cholum fodder, there are many circumstances under which it can be raised more easily, hence its value. For making hay for future use it is decidedly preferable to cholum, not only can it be packed more readily in stacks, but it can be kept in good condition for a much longer period.

101. Paddy hay when made into chaff is a useful food for horses; the following experiment shews the cost of this hay and the cost of chaff made from it:—

	lbs.
Weight of green fodder weighed two hours after being cut ..	4,396
Weight of hay after having been exposed 42 hours, during which time it was repeatedly turned and tossed	1,459

Expenses—

	Rs. A. ⁷ P.
Green fodder 4,396 at 400 lbs. per Rupee	10 15 10
Cost of winning and chaffing.. ..	3 0 0
	Total.. 13 15 10
Cost of chaffed hay per ton	13 15 10
Cost of hay per ton	11 15 10

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108. *Mixed Plantation of Cocoanut and Casuarina Trees.*—A plot of waste land consisting of poor sandy soil, measuring 1,190 square yards, was planted with cocoanut

and casuarina trees, partly to utilize the ground, but chiefly as an experiment in view to ascertain the effect on cocoanut and casuarina trees of a moderate dressing of manure. A line of cocoanut trees and a line of casuarina trees six feet apart were planted alternately over the whole plot. The dimensions of the pits for the cocoanut trees were width each way 24 inches, and depth 27 inches; the pits for the casuarina trees were 18 inches deep and 18 inches wide in each direction. The cocoanut trees had been raised on the farm from nuts; the trees were fifteen months old when planted out; they were planted 12 feet apart in the lines. The casuarina seedlings were about three months old and were bought from a nursery-man at Rs. 5 per thousand; they also were planted with intervals of 12 feet between each. The planting of the ground took place on the 11th of February 1873; there are 134 trees on the plot of which 69 are cocoanut trees. From the time of planting until the 31st of March last the ground has been irrigated twelve times and hoed five times. At the time of planting each pit was manured, four cartloads of blood manure being used for the whole plot; in February 1874 each tree was manured, with two pounds of oil cake, the casuarina trees were pruned nine months after planting, and again in the following March. A few of the trees having failed, they were replaced by seedlings in November last.

109. The appearance of the trees is most promising; their further treatment will be carefully placed on record; it is very desirable that something should be done in order to provide fuel at a moderate price, and in this way set free cow-dung, &c., for use in manuring the soil, instead of as at present, being used as fuel.